Francis Fortin

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Academic curriculum

2019 **PhD in Physics of the Universe**, *CEA Saclay and Université de Paris*, France.

2016 **MSc in Astronomy and Astrophysics**, *Observatoire de Paris*.

2015 **BSc in Fundamental Physics**, *Magistère de Physique Fondamentale d'Orsay*, France.

2013 **Prep. class for Engineering School**, *Lycée Henri Bergson*, Angers, France.

2011 **Baccalauréat**, *Lycée Sainte Agnès*, Angers, France.

Research projects

Post-doc 2020–present — **Binary rEvolution: from binaries to gravitational waves**, *LabEx UnivearthS, laboratoire APC, Université de Paris*.
Coordination of a multi-disciplinary project on X-ray binaries: use Gaia EDR3 to infer the natal kick of neutron stars in high-mass X-ray binaries, recreation of black hole merger events detected by Virgo using hydrodynamical stellar evolution simulations, finding the birthplace of high-mass X-ray binaries with astrometry, characterizing the populations of LISA sources.

Post-doc 2019–2020 — **"Progenitors of LISA compact binaries: the impact of Gaia in population synthesis models"**, *ATER, Astroparticule et Cosmologie (APC), Université de Paris*, France.
Cataloging known X-ray binaries and correlation with Gaia data, simulation of binary evolution tracks with MESA, prediction of GW signals detectable with LISA.

PhD Thesis 2016–2019 — **Binary systems: formation, evolution and environment**, *Supervised by Sylvain Chaty at Commissariat à l'énergie Atomique (CEA)*, Saclay, France.
Analysis of observational data from ESO VLT (ISAAC, X-Shooter, FORS2). Spectroscopic identification of new accreting binaries, caracterization of the environement of an obscured system and a microquasar, census of known X-ray binaries.

Internships — **Revealing the nature of stars orbiting a compact object**, *CEA Saclay, France*.

Optical study of the variability of cataclysmic binaries, *Leibniz-Institut für Astrophysik*, Potsdam, Germany.

Calibration of the Split Pole magnetic spectrometer, *Institut de Physique Nucléaire*, Orsay, France.

Observational and data expertise

Collaborations — **ENGRAVE**, *Operational team FORS2 & X-Shooter*.

Instruments — **VLT**, *ISAAC, FORS2, VISTA, X-Shooter*.

Gaia, *DR2 & eDR3*.

Methods — Data reduction, Photometry, Astrometry, Spectral line modeling, Broadband spectral distribution, Bayesian inference

Software — Python, Iraf, EsoReflex, Gasgano, Molecfit, Topcat

Languages

Fluent in English (C2), basics in Japanese (B1) and german (A2).

Selection of publications

2022 **Fortin**, Garcìa & Chaty, *Finding the birthplace of High-Mass X-ray Binaries using Gaia EDR3*, A&A subm.

2022 **Fortin**, Garcìa, Chaty, Chassande-Mottin & Simaz-Bunzel, *Constraints to Neutron-Star kicks in High-Mass X-ray Binaries with Gaia EDR3*, A&A in press

2020 **Fortin**, Chaty & Sander, *Optical and infrared study of the obscured B[e] supergiant High-Mass X-ray Binary IGR J16318-4848*, ApJ

2018 **Fortin**, Chaty, Coleiro, Tomsick & Nitschelm, *Spectroscopic identification of INTEGRAL high-energy sources with VLT/ISAAC*, A&A

Conferences

2022 **COSPAR**, *Constraints to Neutron-Star kicks in High-Mass X-ray Binaries with Gaia EDR3*, Athens.

COSPAR, *Optical and infrared study of the obscured B[e] supergiant High-Mass X-ray Binary IGR J16318-4848*, Athens.

Pharos, *Constraints to Neutron-Star kicks in High-Mass X-ray Binaries with Gaia EDR3*, Rome.

2021 **Groupe de Recherche Ondes Gravitationnelles**, *Constraints to Neutron-Star kicks in High-Mass X-ray Binaries with Gaia EDR3*, Rome.

Teaching duties

2019–2020 **Experimental Physics and Advanced Experimental Physics (BSc)**, *Université de Paris, France*, Long term practical projects using the university's observatory (126 h).

2017–2019 **Première Année Commune aux Études de Santé (PACES)**, *Université Paris Diderot, France*, Tutorials in Physics (52 h).

2017–2018 **Classe Préparatoire aux Écoles d'Ingénieur (CPEI, L1)**, *Université Paris Diderot, France*, Oral tutorials (19 h) and practical teachings (9 h) in mecanics.

Expertise and outreach

2020 **The Book of Stars**, *Scientific expertise for Ubisoft*, writing of 31 small articles on various types of stars and astrophysical objects for internal reference database.

2016–2017 **Palais de la Découverte**, *Paris, France*, Public outreach, 45' seminars during the weekends about my PhD work (64 h).

Training in science and didactics

2018 **Aspects of the LIGO-Virgo gravitational wave detections**, *M. Barsuglia, APC.*

Didactics in physics, *L. Viennot, APC.*

2017 **Elements of high-energy astrophysics**, *J.P. Lenain, LPNHE.*

Teaching science at the university: learn to teach, *Université Paris Diderot.*

2016 **2nd Asterics VO School**, *Observatoire Astronomique de Strasbourg.*